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RECENT ECHINOIDS (ECHINODERMATA: ECHINOIDEA)
FROM THE MALTESE ISLANDS AND SURROUNDING WATERS

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Introduction

The echinoderm fauna of the Italian peninsula and of most of the surrounding islands is quite well known, mainly through the researches of TORTONESE (see TORTONESE, 1965 and references therein). The echinoderm fauna of the Maltese archipelago on the other hand has received relatively little attention. Indeed, it is true to say that not only the echinoderms, but the marine invertebrate fauna of the Maltese Islands in general is more or less unknown. The Maltese Islands are situated very close to the ridge which separates the Western and Eastern basins of the Mediterranean and thus the fauna of their waters is particularly interesting from a zoogeographical point of view. This paper reports on the recent Echinoidea recorded to date from the Maltese Islands.

TORTONESE (1935) mentioned the presence of specimens of *Stylocidaris affinis*, *Brissus brissus* [= *B. unicolor*] and *Spatangus purpureus* from Malta in the collections of the Museo Civico di Storia Naturale of Genova. The same record of *S. affinis* is again mentioned by the same author in his comprehensive review of the Mediterranean echinoderms (TORTONESE, 1965). 9 species of echinoids have been recorded by MICALLEF & EVANS (1968) in their list of the marine fauna of Malta, without, however, any data being given on distribution, habitat or abundance. GAMBLE (1965) and NEILL & LARKUM (1965) have studied the ecology and behaviour of 2 species of regular echinoids in Malta, while some notes on the natural history of the regular echinoids of the Maltese Islands have been given by SCHEMBRI (1973, 1974).

Species list

The classification used follows that of TORTONESE (1965). Previous records from the Maltese Islands, material studied, distribution data and ecological notes are given for each species listed.

Subclass REGULARIA

Order CIDAROIDEA

Family CIDARIDAE

Cidaris cidaris (LINNAEUS, 1758)

C. cidaris (L.); MICALLEF & EVANS, 1968.

6 specimens, Medina Bank (15°37'E:34°32'N) 18-VI-77, bottom: mud, depth: 310-366 m.

When living the animals were greenish in colour with grey to light brown primary spines and dark brown secondary spines. The denuded tests were olive green with dark green perforated areas and borders of the primary tubercles.

Stylocidaris affinis (PHILIPPI, 1845)

S. affinis (Phil.); TORTONESE, 1935; 1965.

Dorocidaris papillata Leske (sic!); SCHEMBRI, 1973 (emended to *S. affinis* (Phil.); SCHEMBRI, 1974).

1 specimen, Malta: off Marsascala Bay 1972, bottom: muddy-sand;
4 specimens, North Comino Channel VI-75, bottom: mud (leg. M. A. THAKE);
2 specimens, 60 mls SE Lampedusa 21-VI-77, bottom: mud, depth: 300-400 m.

When living the animals were brown in colour with primary spines ranging from pink to light brown and sometimes brown with pink bands. The colour of the secondary spines was yellowish

or yellowish-green but sometimes also red. The denuded tests were light brown with rust brown perforated areas and borders of the primary tubercles.

Prionocidaris baculosa (LAMARCK, 1816)

1 specimen, Malta Dockyards 1976, from ballast tank of ship (leg. J.L. CILIA).

This very common Indian Ocean species is an accidental introduction. The larva no doubt entered the tank when the ship took on saltwater ballast and metamorphosed in the ballast tank. Unfortunately the port of origin of the ship could not be ascertained.

The body of the living animal was chocolate brown in colour. The primary spines had the shaft striped which alternate brown and yellowish-green bands while the collars were yellowish-green with regularly arranged purplish spots. The secondary spines from the body were brown while those surrounding the base of the primary spines (the scrobicular spines) were brown with olive green tips. The specimen had the following dimensions:

Diameter of test	28.2mm
Height of test	20.4mm
Diameter of peristome	10.9mm
Diameter of periproct	11.7mm
Length of primary spines	25.3 - 32.3mm
Length of secondary spines	3.1 - 4.6mm (scrobicular) 2.3 - 2.8mm (from body)

Keys to the Mediterranean cidarids are based on whether the large globiferous pedicellariae possess a terminal tooth (*S. affinis*) or not (*C. cidaris*). The large globiferous pedicellariae of *P. baculosa* lack a terminal tooth, however this species may be distinguished from *S. affinis* and *C. cidaris* by the characteristic purple spots at the base of the primary spines.

Order DIADEMATOIDEA

Suborder AULODONTA

Family DIADEMATIDAE

Centrostephanus longispinus (PHILIPPI, 1845)

C. longispinus Peters (sic!); MICALLEF & EVANS, 1968; SCHEMBRI, 1973.

1 specimen, Malta: Wied iz-Zurrieq 3-VIII-77, bottom: rock, depth: 30 m.

This specimen was taken from a group of 3 individuals under a rocky overhang. Other similar groups of 2-4 individuals were found in the same area under ledges, overhangs and in other dark situations.

Suborder STIRODONTA

Family ARBACIIDAE

Arbacia lixula (LINNAEUS, 1758)

A. lixula (L.); GAMBLE, 1965; NEILL & LARKUM, 1965; MICALLEF & EVANS, 1968; SCHEMBRI, 1973.

2 specimens, Malta: Dahlet il-Fekruna VI-72; 1 specimen, Malta: Sliema (Exiles Bay) 16-VII-72; 11 specimens, Malta: Ramla Bay VIII-76 and I-77; 10 specimens, Malta: Dragunara Point VIII-76.

All these specimens were taken from rocky bottoms at depths ranging from 0.1 to 3 m.

Arbaciella elegans MORTENSEN, 1910

2 specimens, Malta: Marsaxlokk Bay 11-VIII-76, under rocks, depth: 3 m.

This species has not been recorded previously from the Maltese Islands.

Both specimens have a test diameter of 7.0 mm and a test height of 2.7 mm. The body is brown and the spines are of a dark olive green colour.

Suborder CAMARODONTA

Family TOXOPNEUSTIDAE

***Sphaerechinus granularis* (LAMARCK, 1816)**

S. granularis Lam. ; MICALLEF & EVANS, 1968 ; SCHEMBRI, 1973.

2 specimens, Malta: Ghajn Zejtuna VI-72, bottom: sand, depth: 10 m;
1 specimens, Malta: Qawra VI-73, bottom: rock with sandy patches,
depth: 2 m; 1 specimen, Malta: Manoel Island 19-XI-72; 1 specimen,
Malta: Sliema (Exiles Bay) 9-VII-74.

Besides the above, another 20 specimens collected from off the SE coast of Malta from sandy bottoms at depths of 10-30 m were also examined. The majority of the specimens had the typical violet or brown spines with white tips, but in a small number of individuals, the spines lacked the white tips while in 2 individuals the spines were white.

Family ECHINIDAE

***Echinus acutus* LAMARCK, 1816**

1 specimen, Medina Bank (15°37'E : 34°32'N) 18-VI-77, bottom: mud, depth: 310-366 m; 1 specimen (juvenile), Medina Bank (14°50'E; 34°00'N), bottom: mud, depth: 400-422 m; 2 specimens, 60 mls SE Lampedusa 22-VI-77, bottom: mud, depth: 300 m.

There no previous records of this species from the Maltese Islands.

LAMARCK, 1816 **Echinus melo**

Echinus sp.; SCHEMBRI, 1974.

1 specimen (test only), Malta: Ghar Lapsi VII/74.

An intact test of this species found at Ghar Lapsi has been identified as *Echinus* sp. by SCHEMBRI (1974). Subsequent examination of this test has shown it to belong to the present species. No other specimens of this species have been found since.

Psammechinus microtuberculatus (BLAINVILLE, 1825)

P. microtuberculatus (Blainville); MICALLEF & EVANS, 1968; SCHEMBRI, 1973.

(?) *P. miliaris* Müller (echinoplutei); EVANS, 1968.

1 specimen, Malta: Bugibba 11-VI-74.

In a study of the zooplankton of Malta, EVANS (1968) assigned some echinoplutei to *P. miliaris*. As this species does not occur in the Mediterranean, these most probably belonged to *P. microtuberculatus*.

Paracentrotus lividus (LAMARCK, 1816)

P. lividus (Lamarck); GAMBLE, 1965; NEILL & LARKUM, 1965; MICALLEF & EVANS, 1968; SCHEMBRI, 1973.

2 specimens, Gozo: Xatt l-Ahmar VI-73; 3 specimens, Malta: Bahar ic-Caghaq VII-73; 1 specimen, Malta: Dahlet il-Fekruna 27-VII-74; 1 specimen, Malta: Sliema (Exiles Bay) 16-VII-74; 2 specimens, Malta: Marsascala VII-74; 2 specimens, Malta: Qawra 24-VIII-74; 4 specimens, Malta: Mellieha Bay 28-II-74; 179 specimens, Malta: Ramla Bay 8-VIII-76; 84 specimens, Malta: Dragunara Point VIII-76; 23 specimens, Malta: Marsaxlokk Bay VIII-76.

This species is highly variable with respect to colour as can be seen from the following table giving the percentage of specimens in each colour category.

<i>Colour</i>	<i>Dragunara Pt. *</i>	<i>Ramla Bay **</i>
Purple	30.9%	23.4%
Purple/Brown	3.0%	6.8%
Brown	36.8%	26.8%
Brown/Green	10.2%	13.4%
Green	7.3%	16.8%
Reddish brown	11.8%	12.8%

* 68 animals examined

** 149 animals examined

Subclass IRREGULARIA
Order CLYPEASTROIDEA
Family FIBULARIIDAE

Echinocyamus pusillus (O.F. MÜLLER, 1776)

E. pusillus (Müller); MICALLEF & EVANS, 1968.

1 specimen, Malta: Ramla tat-Torri 12-I-77; 1 specimen, Malta: Wied ix-Xaqqa 31-V-77.

Order SPATANGOIDEA
Family Spatangidae

Spatangus purpureus (O.F. MÜLLER, 1776)

S. purpureus Müller; TORTONESE, 1935; MICALLEF & EVANS, 1968.

3 specimens (tests only), Malta: Il-Prajjet IX-73.

The specimens examined were taken by fishermen in trawl nets off the NW coast of Malta and later discarded at il-Prajjet. The exact locality where the animals were taken is unknown. This species does, however, form part of the Maltese fauna since living specimens are occasionally taken from soft bottoms by fishermen trawling a mile or two off the coast.

Family SCHIZASTERIDAE

Schizaster canaliferus (LAMARCK, 1816)

1 specimen (test only), Malta: Mellicha Bay 1976 (lég. L. CASSAR, coll. E.G. LANFRANCO).

There are no previous records of this species from the Maltese Islands.

Family BRISSIDAE

Brissus unicolor (LESKE, 1778)

B. brissus (Leske); TORTONESE, 1935.

B. unicolor Klein (sic!); MICALLEF & EVANS, 1968.

1 specimen (test only), Malta: 1976 (no other data).

Discussion

To date, 15 species of recent echinoids have been recorded from the Maltese Islands. Of these, the record of *P. baculosa* is of a single accidental introduction and may be ignored. *C. cidaris* and *E. acutus* do not seem to occur at all close to Maltese shores. The only Maltese record of *C. cidaris* is that of MICALLEF & EVANS (1968) and this is suspect because of the source of identification used by these authors. This record probably refers to *S. affinis*. The status of *E. melo* is doubtful because so far no living animals have been taken from Maltese waters. Thus, these three species may be regarded as not forming part of the Maltese fauna. On the other hand, further researches may add more species to the Maltese list, particularly of Irregularia.

The echinoid fauna of the Maltese Islands is fairly typical of the Central Mediterranean. Of the Regularia, *P. lividus* is the commonest species and dominates the infralittoral zone on rocky sub-

strata. *A. lixula* is found from the lower mediolittoral to the infralittoral zones in close association with *Paracentrotus*, but is less common. *S. granularis* is the main epifaunal echinoid species of infralittoral soft substrata, while *C. longispinus* is less common and only found on hard substrata below depths of 30 m in dark situations and is a circalittoral species. *S. affinis* is common on circalittoral soft substrata. The status of *P. microtuberculatus* is not clear while *A. elegans* is a rare species of shallow infralittoral rocky substrata.

Of the Irregularia, *E. pusillus* is common in infralittoral coarse sand and gravel, as well as in the detritus beneath the rhizoids of *Posidonia oceanica*. Data regarding the other species is too scanty to allow any general statements to be made.

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SUMMARY

15 species of recent Echinoidea (11 Regularia and 4 Irregularia) are recorded from the Maltese Islands and the surrounding sea. Of these, 4 species have not been previously recorded from this area. One species, *Prionocidaris baculosa* (LAMARCK, 1816) is recorded from a single specimen introduced by shipping. The species are listed together with previous and present records from the Maltese Islands. Some ecological data is included. The status of each species is discussed. Of the 15 species recorded, only 11 are regarded as forming part of the Maltese echinoid fauna.

Key words: *Echinoidea*, Maltese Islands, faunal lists.

RIASSUNTO

Echinoidi recenti (Echinodermata: Echinoidea) delle coste Maltesi

Si segnalano 15 specie di Echinoidi recenti, raccolte in acque Maltesi. Di queste specie, 4 non sono state menzionate precedentemente per questa zona, mentre un'altra, *Prionocidaris baculosa* (LAMARCK, 1816), viene segnalata in base al rinvenimento di un singolo esemplare introdotto con la navigazione. Sono menzionate anche precedenti segnalazioni per le acque Maltesi e vengono forniti alcuni dati ecologici. Si discute l'importanza di ognuna delle specie rinvenute di cui solo 11 sono da considerarsi elementi della fauna maltese di Echinoidei.

Parole chiave: *Echinoidea*, Isole Maltesi, fauna.

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